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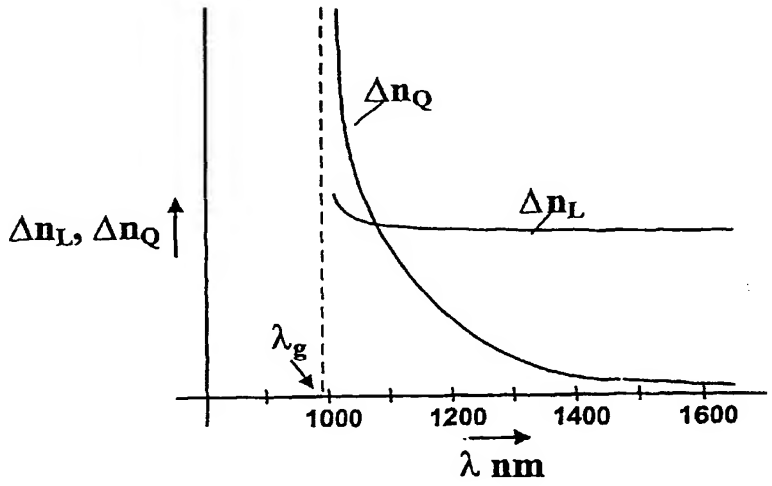
(54) Title: ELECTRO-OPTIC MODULATORS INCORPORATING QUANTUM DOTS



(57) Abstract: A modulator is formed of a semiconductor material which utilises the electro-optic effect to achieve a change in the refractive index Δn of the material under the influence of an applied electrical field F (251), in accordance with the equation: $\Delta n = -\frac{1}{2} n_0^3 [rF + sF^2] \equiv \Delta n_L + \Delta n_Q$ where n_0 is the refractive index of the material at zero field, and Δn_L and Δn_Q are the linear and quadratic contributions to the change in refractive index respectively, r is the linear electro-optic coefficient of the material and s is the quadratic electro-optic coefficient of the material incorporating a plurality of quantum dots and operating in a wavelength region where the value of rF is sufficiently greater than the value of sF^2 so as to operate with the dominant effect on the refractive index Δn being contributed by the linear effect. In this way, a device with a wide bandwidth is achieved by appropriately separating the band-gap wavelength (λ_g) and the operating wavelengths (λ).

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